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EPA Superfund
Record of Decision:

EASTERN DIVERSIFIED METALS
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HOMETOWN, PA
09/29/1993

Text:
DECLARATION

RECORD OF DECISION
EASTERN DIVERSIFIED METALS SITE

Operable Unit Two: Deep Ground Water

SITE NAME AND LOCATION

Eastern Diversified Metals Site
Hometown, Schuylkill County, Pennsylvania

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the deep ground water portion of Operable Unit 2 (OU2) of the Eastern Diversified Metals Site located in Hometown, Schuylkill County, Pennsylvania (Site), which was chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA) and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. Part 300. This decision document explains the factual and legal basis for selecting the remedy for this portion of OU2 and is based on the Administrative Record for this operable unit. An interim remedy was selected for the shallow ground water in a previous Record of Decision of March 1991.

The Commonwealth of Pennsylvania does not concur with the selected remedy.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances, pollutants, or contaminants in the deep ground water from this Site have not presented, and do not currently present, an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE REMEDY

The response action selected consists of no remedial action. Ground water monitoring will not be performed since the contamination occurs under State Game Lands and there currently are no downgradient wells in this area, nor are any wells likely to be placed there in the future.

This is the third Record of Decision issued for the Eastern Diversified Metals Site to address the contamination problems present in the various environmental media. The division of the operable units (OUs) is as follows:

- OU1: "Hotspot" areas: Those areas of fluff and soils contaminated with PCBs and dioxin above target levels

  Sediments and soils contaminated with metals

above target levels

Miscellaneous debris

- OU2: Shallow ground water

  Deep ground water

- OU3: Remainder of the fluff at the Site

A remedy for the first operable unit and an interim remedy for the second operable unit were selected in the Record of Decision of March 1991. The interim remedy includes enhancement of the overburden ground water collection system and upgrading the existing waste water treatment plant for the removal of metals. These actions will not be affected by this Record of Decision and will be performed. A remedy for the third operable unit was selected in the Record of Decision of July 1992. This remedy is the final remedy for deep ground water of the second operable unit and calls for no remedial action.

STATUTORY DETERMINATIONS

EPA has determined that no remedial action for the deep ground water is necessary at this Site to ensure protection of human health and the environment. No Federal and State requirements that are legally applicable or relevant and appropriate apply to this remedy since no remedial action will be taken. Because hazardous substances remain at the Site, a review will be conducted within five (5) years after this Record of Decision is signed to ensure continued protection of human health and the environment.

FINAL

RECORD OF DECISION

FOR THE

EASTERN DIVERSIFIED METALS SUPERFUND SITE

OPERABLE UNIT 2: DEEP GROUND WATER

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FINAL

RECORD OF DECISION

FOR THE

EASTERN DIVERSIFIED METALS SUPERFUND SITE

OPERABLE UNIT 2: DEEP GROUND WATER

DECISION SUMMARY

I. SITE NAME, LOCATION, AND DESCRIPTION

The Eastern Diversified Metals Site is a former metals reclamation facility located in Rush Township, Schuylkill County, Pennsylvania (see Figure 1). The Site is located approximately one mile northwest of the intersection of Routes 54 and 309 in the town of Hometown. The Site is approximately 1000 feet west of Lincoln Avenue (SR1021) at the western end of a light industrial park. The Site is situated in a valley that slopes down to the west. State Game Lands border the Site to the west and southwest and private forested land borders the Site to the north and south. The Little Schuylkill River flows in a southsoutheasterly direction approximately 250 feet west of the Site. A small tributary flows westerly along the southern border of the Site in the valley bottom, discharging to the Little Schuylkill. The Site covers approximately 25 acres and contains partially forested land; a 7.5 acre pile of plastic "fluff;" and areas of contaminated soil, sediment, surface water, and ground water (see Figure 2). The fluff pile consists of material from the recycling of copper and aluminum communication and power wire and cable. It is composed primarily of polyvinyl chloride and polyethylene insulation chips, with some fibrous material, paper, soil, and metal. An estimated 350 million pounds of fluff are present onsite in a pile approximately 250 feet wide by 1,500 feet long by 40-60 feet high.

Shallow ground water at the Site occurs in shallow perched zones and the

overburden. Deep ground water occurs in joints, fractures, and weathered zones in the bedrock. Ground water flows both laterally and vertically; lateral flow is directed southwestward across the Site toward the unnamed tributary of the Little Schuylkill River and the Little Schuylkill River, and vertical downward water flow occurs in the upslope portion of the Site with some discharge of the ground water occurring to the unnamed tributary in the downslope portion of the Site area. All remaining ground water in the Site area discharges to the Little Schuylkill River.

II. SITE HISTORY AND ENFORCEMENT ACTIVITIES.

Prior to 1966, the Site property was owned by a manufacturing company engaged in the extrusion of aluminum for hospital furniture. Pre-1966 activities were confined to a single building on the property, with the remainder of the Site left vacant. The manufacturing company disposed of wooden wire reels, wooden pallets, and similar debris and trash onsite.

In or around September 1966, Greater Tamaqua Industrial Development Enterprises conveyed the Site property to Eastern Diversified Metals Corporation (EDM). EDM operated at the Site, reclaiming copper and aluminum from wire and cable in a processing building on Lincoln Avenue, from approximately 1966through 1977. The EDM plant received wire from numerous sources. Plastic insulation surrounding metal cable and wire was mechanically stripped and separated from the metal using gravitational separation techniques. This process involved chopping the wire, stripping the plastic coating from the wire with steel blades, and separating the wire from the plastic coverings through the use of air and water clarifiers.

The metal reclaimed by EDM was either sold or returned to the sources. EDM disposed of the waste insulation material on the ground in the topographic swale area behind the plant at the Site. The fluff which currently exists is a direct result of this disposal practice.

In 1971, EDM submitted an application to the Pennsylvania Department of Health (DOH) for a permit to operate a 25 acre industrial landfill. DOH inspected the EDM Site in February 1972, and noted that EDM was in violation of the Pennsylvania Clean Streams Law because the waste pile was creating leachate that flowed into the Little Schuylkill River via a small unnamed tributary running through the EDM Site.

In February 1973, the Pennsylvania Department of Environmental Resources (PADER) inspected the Site. PADER's inspection report noted that there were two separate but adjacent disposal areas on the EDM Site; mixed waste was disposed on the extreme western portion, while shredded insulation material was dumped in the north central portion. The "mixed waste" consisted of cardboard, paper, wooden pallets and reels, steel wire and general waste. The report also noted that scrap metal and 55-gallon steel drums were stored onsite.

In December 1973, the Pennsylvania Division of Solid Waste Management determined that EDM would have to provide a permitted leachate collection and treatment system and a groundwater monitoring system before a landfill disposal permit could be issued. In 1974, EDM submitted an application for a Water Quality Management Permit. Theodore Sall, Inc. (Sall) installed a

leachate collection and treatment system onsite in order to monitor, collect, and treat leachate emanating from the fluff pile. Due to the high BOD concentrations in the leachate at that time, Sall designed and installed a secondary treatment system. The secondary treatment plant used clarification, aeration, and activated sludge biological treatment to bring the effluent within the limits allowed by its PADER National Pollutant Discharge Elimination System (NPDES) permit. The effluent discharge enters the unnamed tributary to the Little Schuylkill River. Daily flows average approximately 3,000 gallons. The treatment plant is part of a leachate management system which also includes an equalization lagoon, erosion control measures, surface water diversion ditches, and two shallow ground water interceptor trenches which convey shallow ground water and leachate to the waste water treatment plant.

The equalization lagoon is located approximately 300 feet to the northeast of the treatment plant, at the base of the main fluff pile. The lagoon is lined with 30 mil polyvinyl chloride and feeds leachate influent to the treatment plant.

The leachate diversion ditches at the Site parallel the northern and southern boundaries of the main fluff pile. The southern diversion ditch conveys leachate to the treatment plant via an equalization lagoon. The northern (interior) diversion ditch terminates at the runoff lagoon, where runoff either evaporates or infiltrates to shallow ground water.

The main shallow ground water interceptor trench is located along almost the full east-west length of the main fluff pile, between the southern leachate diversion ditch and the unnamed tributary. At the southwest end of the main fluff pile, a secondary collection trench runs approximately northsouth to collect shallow subsurface leachate at the western edge of the pile. The trenches are approximately six to ten feet deep. The leachate from the main trench discharges into the wastewater treatment plant; the leachate from the secondary trench is conveyed to a sump just southwest of the treatment plant, from which it is pumped directly to the plant for treatment.

In or around 1977, EDM terminated operations at the Site and, subsequently, transferred ownership of the Site to Theodore Sall, Inc. ["Sall"]. In June and November, 1979, the Hometown Fire Company responded to reports of fires at the Site; the fires were extinguished with fire retardant and water. The area where smoldering fires were noted is limited to a portion of the main fluff pile in the vicinity of the secondary leachate seep (southeast side of the pile). Sall excavated the burned areas in an effort to ensure that the fire was extinguished and installed temperature sensors to detect elevated temperatures within the pile. Laboratory testing estimated that a critical temperature of approximately 290 Fahrenheit may cause this material to smolder. Sall reports that temperature monitoring conducted since that time has shown that temperatures do not approach those which would be required for the material to smolder.

In 1979 and 1980, the Rush Township Board of Supervisors wrote letters to Diversified Industries, Inc., EDM and Sall's parent company, on behalf of area residents, complaining of odors from the EDM Site and expressing health concerns. In 1983 and 1984, PADER conducted chemical and aquatic biological investigations of the Little Schuylkill River (LSR) and all of its

tributaries and point source discharges. These studies included sampling of the unnamed tributary at the EDM Site and the effluent from the leachate treatment plant. PADER stated that under the acid-impacted conditions found in the LSR, "the confirmed complete absence of any aquatic macrobenthic community is expected." This report concluded that an evaluation of the effects of the EDMSite on the LSR could not be made due to the prevailing acid mine drainage degradation in this section of the LSR.

In 1985, Todd Giddings and Associates, Inc. completed a Site evaluation report for Sall. This evaluation included sampling and analysis of surface water, leachate, ground water, fluff, and sediment. These investigations determined that the fluff failed the Extraction Procedure Toxicity test for lead and that the fluff pile contained a polychlorinated biphenyls (PCBs) hotspot area. Additionally, various metals were detected in the downgradient monitoring well.

In 1985, EPA sampled the Site's surface soil, surface water, stream sediment, leachate, leachate runoff path sediment, and ground water to provide data in order to further assess the Site. EPA proposed the Site for inclusion on the CERCLA National Priorities List (NPL) in June 1986. EPA finalized the Site on the NPL in October 1989 (see 54 Fed. Reg. 41036 (Oct. 4, 1989)).

In August 1987, EPA issued an administrative order pursuant to section 106(a) of CERCLA, 42 U.S.C. S 9606(a), to Diversified Industries, Inc. and Sall directing those entities to install a security fence around the Site. The fence was subsequently installed by those parties.

In October 1987, Sall and AT&T Nassau Metals Corporation ("AT&T") signed an administrative order on consent with EPA for the performance of a Remedial Investigation/Feasibility Study (RI/FS) at the Site. The purpose of the RI/FS was to determine the nature and extent of contamination and to evaluate remedial alternatives for implementation at the Site. Samples were collected and analyzed from fluff, air, soils, sediments, ground water, and surface water. A majority of these samples were taken in and around the fluff pile area.

On March 29, 1991, EPA issued a Record of Decision selecting a final remedy for OU1 and an interim remedy for OU2 (see Section IV of this ROD fordetails concerning operable units at this Site). The Commonwealth of Pennsylvania concurred on that ROD. The Remedial Action selected by EPA for OU1 and OU2 calls for among other things, the following actions to be undertaken:

OU1 ù Excavate and incinerate, either onsite or offsite, fluff and soils containing dioxins and PCBs in concentrations exceeding target levels.

. Treat (if necessary) and dispose of incinerator residuals, miscellaneous debris, and soils/sediments contaminated with metals above target levels.

OU2 ù Enhance the existing or construct a new shallow ground water collection and treatment system.

- Study further the practicability of deep ground water restoration.

In September 1991, AT&T petitioned EPA to reopen the March 1991 ROD, claiming that PCB analytical results reported and relied on in the RI/FS were inaccurate. Attached to the petition were recent analytical data showing that PCBs were present at much lower concentrations in the hotspot area than indicated by the original analyses (see AT&T petition in the Administrative Record for the July 1992 ROD).

In September 1991, EPA issued a Unilateral Administrative Order (Order) to AT&T and Sall to implement portions of the remedy described in the March 1991 ROD which did not pertain to the remedy for the hotspot area. The Order directed AT&T and Sall Inc. among other things, remove the miscellaneous debris from the Site, repair the fence surrounding the Site, and conduct additional ground water studies.

In December 1991, EPA sampled the fluff material in the PCB hotspot and, with the aid of analytical techniques which were not available at the time the original analyses were performed, determined that the levels of PCBs in this area are lower than were previously thought. This analysesrevealed the presence of Polychlorinated Naphthalenes ("PCNs") in what was formerly defined as the PCB hotspot area. PCNs are very similar in chemical structure to PCBs and for this reason may have been mistaken for PCBs in previous analyses on the hotspot fluff. PCNs may have been used as a fire retardant to coat the wire or in the paper insulation in electrical wire and cable processed at the Site. EPA is evaluating the level of PCNs found in the hotspot areas and will determine whether the incineration remedy selected to address the hotspot areas in the March 1991 ROD is still appropriate.

In July 1992, EPA issued a Record of Decision for the remainder of the fluff pile (OU3) in which EPA selected recycling of the fluff into either a final product or a form that will undergo further processing offsite in order to produce a final product. The ROD additionally called for, among other things, testing and appropriate disposal of any recycling residuals and sampling and analysis of soils underlying the fluff pile.

A Remedial Design Work Plan and a Remedial Action Work Plan and Design Report for miscellaneous debris removal were reviewed and approved by EPA in early 1993. All debris piles were removed for offsite disposal in the summer of 1993. Approximately 6,500 cubic yards of debris consisting of unchopped wire, wood, scrap metal, soil, and fluff were removed from the Site.

Other action taken in the summer of 1993 included the containerization of approximately 630 cubic yards of dioxin-contaminated fluff from several burn areas onsite and improvements to the leachate diversion ditches and drainage ditches at the Site. The interior and exterior drainage channels and runoff lagoon were upgraded to increase their capacity and to comply with the Commonwealth of Pennsylvania requirements for these structures.

EPA has recently accepted a Supplemental Hydrogeologic Investigation Report

on the Site conducted by contractors for AT&T. The study investigatedthe presence and movement of ground water contaminants in the Site area. The study confirmed that discrete ground water flow in the area bedrock is anisotropic, occurring along joints, fractures, and permeable bedding planes. The overall resultant vectors of flow, however, are controlled by topography; thus ground water flow converges at the stream valley axis fracture, and proceeds westward toward the Little Schuylkill River. Thus, the piezometric surfaces shown in Figures 3 and 4 represent the overall flow directions within the bedrock systems, but not the discrete localized flow pathways along joints, fractures, and/or bedding planes.

Presently, the Site is unused. The property was overseen by a Sall employee who was responsible for the daily operation and general maintenance of the wastewater treatment plant, recording temperatures from the pile sensors, and general security. The caretaker was present onsite for approximately half of the day for five days each week. On June 22, 1993, this employee shut off the electrical power to the waste water treatment plant (WWTP) and discontinued Site operations due to the pending Chapter 7 bankruptcy proceedings of Sall. On July 6, 1993, PADER sampled the effluent from the NPDES discharge for certain metals and chemical/physical properties. Lead, copper and zinc were present in the effluent at concentrations in excess of

Pennsylvania Ambient Water Quality Criteria. Iron and manganese were present in concentrations in excess of Pennsylvania Secondary Drinking Water Standards for Surface Water.

On July 30, 1993 EPA sampled the effluent for a full priority pollutant scan of organic contaminants. No organic chemicals were detected in the effluent sample above the detection limit of the analytical equipment and procedures used. III. HIGHLIGHTS OF COMMUNITY PARTICIPATION

The Proposed Remedial Action Plan for OU2 for the Eastern Diversified Metals Site was released to the public on July 1, 1993. The plan, together with the documents contained in the administrative record file, was made available to the public in both the EPA Docket Room in Region III and the information repository at the Rush Township municipal building in Hometown, Pennsylvania. In accordance with Sections 113(k)(2) and 117 of CERCLA, 42 U.S.C. SS 9613(k)(2) and 9617, on July 1, 1993, EPA placed a 1/4 page advertisement in the Times News newspaper announcing the availability of the OU2 Proposed Remedial Action Plan and administrative record file and commencement of a 30-day comment period. The public comment period began July 1, 1993 and ended July 31, 1993.

A public meeting was held on July 15, 1993. At this meeting, EPA representatives summarized the results of the Supplemental Hydrogeologic Report, explained the rationale for EPA's preferred alternative for the operable unit and answered questions from citizens at the meeting about the Site. A response to the comments received during the public comment period is included in the Responsiveness Summary, which is part of this Record of Decision.

IV. SCOPE AND ROLE OF OPERABLE UNITS

As set forth above, EPA has divided the Eastern Diversified Metals Site into

operable units, or site components, in order to effectively address the complex contamination problems present in the various environmental media. As stated above, the divisions to date are as follows:

OU1 ù "Hotspot" areas: (those areas of fluff and soils contaminated with PCBs and dioxin above target levels)
- Sediments and Soils contaminated with metals above target levels
- Miscellaneous Debris

OU2 ù Ground Water

OU3 ù Remainder of the fluff

In March 1991, EPA signed a Record of Decision which documented the selection of a final remedy for OU1 and an interim remedy for OU2, as described above. The actions selected in the March 1991 ROD for OU2, including enhancement of the shallow ground water collection system, upgrading the existing waste water treatment plant to treat for metals and the removal of metalscontaminated sediment in the unnamed tributary of the Little Schuylkill River, are not affected by this ROD and will be performed.

EPA will advise the public if that portion of the OU1 remedy currently being reviewed as a result of AT&T's petition changes in any significant or fundamental way.

In July 1992, EPA signed a Record of Decision which documented the selection of a final remedy for OU3. This ROD did not, however, address remediation of soils underlying the fluff at the Site. EPA will announce whether, and to what extent, further response actions are necessary to address any soil contamination in a subsequent Record of Decision.

This Record of Decision selects a final remedy for the deep ground water at the Site.

V. SUMMARY OF SITE CHARACTERISTICS

A. Environmental Setting and Climate

The Site is located in a sparsely populated rural area in Hometown, Schuylkill County, Pennsylvania. Nearby towns include Tamaqua, which is approximately 2.5 miles to the southeast. Land use surrounding the Site includes open and residential lands to the north, west, and south/southeast, and several business and industrial facilities to the east. Specifically, the Site is bordered by a residence and privately-owned forest land to the north. Adjacent to the eastern border of the Site is the Lincoln Avenue building which was used to process the EDM fluff. This building is presently partially occupied by a trailer home assembly operation. Other commercial operations near the Site along Lincoln Avenue include a shipping facility (United Parcel Service), an auto parts/junkyard operation, a heavy freight depot (Yellow Freight), and a pigments manufacturer (Silberline Manufacturing Company). State Game Lands are located to the west along the banks of the Little Schuylkill River.

Land use in Schuylkill County is primarily agricultural (82.7 percent). The remaining area is residential (approximately 5.3 percent); manufacturing, commercial, or mining (approximately 4.5 percent); and other (7.5 percent).

B. Regional Geology, Hydrogeology, Hydrology

1. Soils

Soils on the Site have formed in colluvium, along drainage ways and in depressed areas. The soils are deep, poor to moderately well-drained with slow to moderately slow permeability and medium runoff. The lower part of the subsoil layer (which begins approximately 20 to 40 inches from ground level) contains a firm and brittle fragipan that restricts vertical water flow and facilitates lateral flow of shallow subsurface waters. Depth to bedrock may be 60 to 96 inches or more from the ground surface.

2. Geology

Bedrock beneath the Site is the middle member of the Mississippian Age Mauch Chunk Formation. The Mauch Chunk is generally described as predominantly composed of grayish-red sandstones and shales, and grayish-redpurple sandstones. The Mauch Chunk Formation is overlain by the Pottsville Formation, and underlain by the Pocono Formation. Both contacts are considered to be transitional, and both the Pottsville and Pocono Formations are characterized by coarse-grained yellow and gray sandstone and conglomerate lithologies. Topographically, the Mauch Chunk tends to be a valley-former due to the greater resistance to erosion which typifies the more massive Pottsville and Pocono formations.

3. Hydrogeology

Water is transmitted through the Mauch Chunk primarily through fractures, joints and along permeable bedding zones. The formation has low to moderate infiltration capacity and probably low to moderate aquifer potential. In general, the Mauch Chunk is described as yielding small to moderate supplies of good quality water. Mauch Chunk ground water in the Schuylkill River Basin area is reported to have a median pH value of 7.7 and a median specific conductance value of 120 micro mhos/cm.

Shallow ground water occurs in limited quantities under both perched and water table conditions in the overburden. Dynamics of ground water flow in the overburden are basically those of porous media flow, where primary permeability dominates and the system is assumed to be essentially homogeneous (despite the obvious presence of certain inhomogeneities). Perched water in the main fluff pile was encountered in the eastern pile piezometer. Perched flow occurs in some areas due to the presence of fragipans in the colluvial soil. This flow component carries leachate from the pile, some of which is intercepted by the existing shallow ground water interceptor trench system and conveyed to the waste water treatment plant.

Underlying the perched flow zone, a local ground water system is present in the overburden. The overburden is dry in some areas and saturated in others, with classical porous media flow possible only in the southwest

section of the Site, near the headwaters of the unnamed tributary. The ground water quality data collected in the RI indicates that the overburden flow system recharges the upper bedrock; thus vertical downward flow occurs, as well as lateral flow.

Horizontally, flow in the overburden is directed southwestward across the Site at approximately 0.11-0.13 feet per foot (see Figure 3). However,it should be noted that much of the ground water which enters the overburden likely recharges the bedrock rather than flowing laterally, as evidenced by the extensive dry seasonal conditions above the bedrock. It appears that the only substantial lateral flow in the Site overburden may occur in the southwestern portion of the site, where wells MW-3/O and MW-6/O contain water year-around. Based on constructed piezometric surfaces, the overburden flow system recharges the unnamed tributary along its lower length. Since the lower reach of the stream is known to flow year-round, it is evident that this flow is sustained by the shallow system in the southwest portion of the Site. This is consistent with the saturated conditions at MW-3/O and MW-6/O, verifying sustained lateral flow through the overburden in the southwest corner of the Site.

Most of the deep ground water at the Site occurs in joints, fractures, permeable interbeds, and weathered zones in the bedrock. Water was present in multiple thin zones separated by two to several tens of feet during the monitoring well installations. Commonly, ground water conditions in bedrock of this type are complex due to intricate localized lithological and structural controls. Thus, ground water may be under confined permeability, and possibly unconfined conditions in permeable vertical fractures or extensive nearsurface weathered zones.

The vertical head conditions (varying from strong downward to slight upward) at the Site verify the complexity of ground water conditions. However, it can be observed that the water levels measured reflect the potential for hydraulic connection among the three aquifer zones monitored.

Flow in the shallow bedrock zone is similar in direction and gradient to the overburden. Water level elevation contours indicate that flow occurs below the elevation of the unnamed tributary stream bed, in a direction towards the Little Schuylkill River (see Figure 4). Thus the direct discharge pointfor the shallow bedrock ground water flow appears to be the Little Schuylkill River, which is the only regional discharge point in the area. The lateral hydraulic gradient in the intermediate bedrock aquifer also indicates flow toward the Little Schuylkill River.

An inventory of ground water usage was completed for the Site vicinity. Figure 5 shows the locations of water wells identified during the RI and the Supplemental Hydrogeologic Investigation. All of the wells identified are topographically upgradient of the Site. Well depths range from 90 feet to 600 feet. A number of residents have reported flowing artesian conditions, indicating a possible recharge area to the north, i.e., the Still Creek Reservoir Area. Water quality was reported to be good in most cases, although some wells had taste, odor, and sediment problems unrelated to the Site.

4. Hydrology

This part of the Schuylkill River Basin receives an annual average rainfall of 45 inches. Basin maxima for runoff (30 inches) and rainfall (49 inches) occur near Tamaqua and decrease from north to south. Peak runoff occurs during the period from February to April. The runoff low point is generally during August to October, although at Tamaqua, low runoff typically occurs in July.

Surface runoff from the Site flows predominantly in a westsouthwesterly direction, to the small unnamed stream which flows west along the southern border of the Site and drains into the Little Schuylkill River.

VI. NATURE AND EXTENT OF CONTAMINATION

A. Supplemental Hydrogeologic Investigation

The Supplemental Hydrogeologic Investigation (SHI) was called for in the March 1991 OU2 ROD. The purpose of the SHI was to provide additionalinformation on the need for, and the practicability of, deep ground water restoration at the Site. The investigation was designed to define the extent of any ground water degradation in the watershed as a whole, evaluate the direction of ground water flow, and determine the location of discharge areas for the bedrock flow systems. The scope of the SHI included installation of new ground water monitoring wells and wetlands piezometers. Surface water, stream sediments and ground water were sampled in this investigation to assess the distribution of volatile organics (VOCs) and manganese in the ground water/surface water system, and to help identify the ground water discharge zones. VOCs and manganese were contaminants of concern identified during the Remedial Investigation.

Figure 6 shows the sampling point locations for the samples collected during the SHI.

In February 1992, surface water and sediment samples were obtained from the unnamed tributary to the Little Schuylkill River, the Little Schuylkill River and the three wetland piezometers.

Three sampling points were located in the unnamed tributary; one upstream of the Site WWTP discharge, where the stream begins to flow perennially, (SW-4/SED-2); one downgradient of the Site WWTP discharge (SW-6/SED-4), where shallow bedrock and overburden discharges may occur; and one just upgradient of the confluence of the unnamed tributary with the Little Schuylkill River (SW7/SED-5), in a ground water discharge zone.

The SHI additionally included the installation of a total of nine additional monitoring wells in the Site area. At each location, one or two bedrock wells were installed (corresponding to the shallow and intermediate depth wells installed during the RI/FS). One overburden well was installed, at well cluster location 9.

Four of the wells were installed in an area downgradient of the Site across, and to the south of, the unnamed tributary to the Little Schuylkill River. These wells, installed in two locations (Clusters 9 and 10), were intended to provide data to assess the extent of contaminant migration from the Site,

if any, beneath the unnamed tributary. A third cluster (Cluster 11) of two wells was installed downgradient of the Site in the vicinity of the Little Schuylkill River to provide an indication of the ground water quality and hydraulic gradient in that area. One

additional cluster (Cluster 12) of two bedrock wells was installed northeast of the Site to monitor background ground water quality. A single shallow bedrock well (MW-13/S) was installed east of the Site to provide information on flow direction and ground water quality adjacent to other upgradient off-site potential contamination sources.

Following the installation and surveying of these wells, five rounds of water level measurements were collected over a three-month period. This data enabled EPA to determine ground water flow directions and the vertical head relationships between adjacent wells of different depths in the bedrock flow system.

In August 1992, a total of 14 monitoring wells in the Site area were sampled. Eight of the newly installed wells and six wells installed during the RI were sampled at that time. Newly installed monitoring well MW-9/O was not sampled because it did not contain water on the sampling date.

B. Summary of SHI Findings

The surface water and sediment analysis results are summarized in Table 1, and plotted on Figure 7. Field parameter measurements for surface water are presented on Table 2.

Ground water sampling results are summarized in Table 3 and plottedon Figure 8. Field parameter measurements on ground water are presented on Table 4.

Surface Water and Piezometer Results

Trichloroethene (TCE) was detected in four of the six surface water samples, and one of the three wetland piezometer samples. The detection of 12 ug/L of TCE in the sample furthest upstream of the Site in the unnamed tributary (SW-4) was the highest concentration of the three samples taken from the stream. A low concentration of 2 ug/L was reported for the sample downstream of the WWTP (SW-6). The most elevated concentration was detected in the sample from the Little Schuylkill River at the confluence with the unnamed tributary (SW-11), where 120 ug/L of TCE was reported. The sample was taken close to the shore of the LSR from the mixing zone of the unnamed tributary with the LSR. Just upstream of the confluence on the unnamed tributary a spring may be discharging ground water contaminated with TCE to the unnamed tributary. The mid stream sample (SW-7) had a concentration of 5 ug/L of TCE detected. There were no VOCs detected in surface water samples in the Little Schuylkill River upstream (SW-10) or downstream of this sampling point (SW-9). The water sample from the wetland piezometer closest to the unnamed tributary (WP-2) had a low level concentration of TCE (estimated 3 ug/L); the other piezometers had no volatile organics detected. The detection limit is the lowest concentration of an analyte that

can be positively identified and quantified in a sample using an analytical instrument and an EPA specified method of analysis. Even though no

hazardous substances were detected in a sample they may be present in an amount that is below the detection limit.

Trichloroethene was the only VOC detected in surface water samples except in the case of SW-11 (at confluence). Low concentrations of 1,1,1trichloroethane (3 ug/L), carbon tetrachloride (8 ug/L) and 1,2 dichloroethene (4 ug/L) were also reported for this sample.

The upgradient stream sample on the LSR (SW-10) had a dissolved manganese concentration of 286 ug/L. Dissolved manganese results ranged from 1510 ug/L to 2860 ug/L in the lower reach of the unnamed tributary and in the Little Schuylkill River at the confluence. The sample from wetland piezometer WP-1 also had a higher dissolved manganese concentration (4740 ug/L). The remaining surface water samples, including the downstream sample on the LSR (SW-9), had 305 ug/L or less of dissolved manganese.

Sediment Results

Sediment sample results were similar in pattern to those reported for the corresponding surface water samples. Trichloroethene was detected at low concentrations (estimated 2 ug/Kg) in the sample furthest upstream in the unnamed tributary (SED-2). No VOCs were detected in the two downstream unnamed tributary sediment samples. The sediment sample from the LSR at the confluence with the unnamed tributary (SED-9) had a TCE concentration of 40 ug/Kg. The downstream sediment sample on the LSR (SED-7) had 50 ug/Kg of TCE reported; the upstream sample (SED-8) had no volatile organics detected. No TCE was detected in any of the three wetland sediment samples.

Two of the three sediment samples found to contain TCE contained no other VOCs. The sample from the LSR downstream of the confluence (SED-7) had 230 ug/Kg of acetone and 1 ug/Kg of toluene in addition to the TCE. The wetland sediment sample closest to the LSR on the fracture trace (WS-3) had a concentration of 280 ug/Kg of acetone. This was the only VOC detected in this sample. The acetone detections, although not invalidated in the quality assurance review, are still suspect. Acetone is a common laboratory contaminant and has not been detected in the surface water or ground water in the rest of the sample analyses.

Total manganese results somewhat paralleled those for dissolved manganese in surface waters. The upstream sediment sample in the LSR had a manganese concentration of 168 ug/Kg while the downstream sample was 295 g/Kg. Sediment samples from the unnamed tributary and confluence were higher, ranging from a high of 2890 ug/Kg in SED-5 just upstream of the confluence to a low of 913 ug/Kg in SED-2, the furthest upstream sample. Of all the wetland sediment samples, WS-3 had the highest total manganese with a concentration of 1,620 ug/Kg. WS-1 and WS-2 had lower concentrations of 826 ug/Kg and 299 ug/Kg, respectively.

Ground Water Analytical Results

Background Wells

The two upgradient background wells to the northeast of the valley bottom fracture (MW-12/S and MW-12/I) had no concentration of TCE detected. No

chlorinated volatile organics were present in the MW-12 cluster, but xylene (14 and 12 ug/L) and ethyl benzene (3 and 2 ug/L) were detected in both wells, while toluene was detected in MW-12/I (2 ug/L). However, the upgradient background well to the southeast of the fracture (MW-13/S) had a reported 150 ug/L of TCE. MW-13/S displayed a different suite of contaminants than that observed in the MW-12 cluster. Besides the substantial concentration of trichloroethene, 1,2-dichloroethene (10 ug/L), carbon tetrachloride (6 ug/L) and tetrachloroethene (2 ug/L) were present, and 1 ug/L of xylene was reported. Dissolved manganese concentrations in the background wells were fairly similar, with 256 ug/L observed in MW-12/S and 252 ug/L in MW-13/S. MW-12/I had a somewhat higher concentration of 581 ug/L.

Bedrock Wells

Three of the four wells on the Site property (MW-2/S, MW-2/I and MW-5/S) had similar results, with concentrations of trichloroethene (at 43, 36 and 23 ug/L, respectively), 1,2-dichloroethene (estimated at 2, 4 and 0.9 ug/L, respectively), and 1,1,1-trichloroethane (estimated at 2, 2 and 1 ug/L, respectively); the MW-2 wells also had concentrations of carbon tetrachloride (estimated at 2 and 0.9 ug/L, respectively). The only VOC detected in the sample from MW5/I was a trace level (estimated 0.5 ug/L) of xylene, which was also detected in MW-2/I (estimated at 3 ug/L). Concentrations of these contaminants were estimated due to their low level presence in the samples below the required detection limit.

The results of the 1992 sampling and analysis are similar to those observed in the 1989 sampling event for the RI. Trichloroethene concentrations are approximately one-half of those observed in the three wells in 1989; trichloroethene was not detected in MW-5/I in 1989 or 1992. Most of the same compounds were detected in the four wells in these sampling events. The list of detections differs only in the presence or absence of compounds at trace levels.

Results in the five off-property bedrock wells installed for the SHI (MW-9/S, MW-10/S, MW-10/I, MW-11/S and MW-11/I) varied somewhat. Trichloroethene was detected in each of the wells (20, 5, 5, 290 and 64 ug/L, respectively). Besides trichloroethene, 1 ug/L of 1,1,1-trichloroethane was the only other compound detected in MW-9/S.

In addition to trichloroethene, MW-10/S had trace level concentrations of 1,2-dichloroethene (.9 ug/L), 1,1,1-trichloroethane (.6 ug/L) and ethyl benzene (1 ug/L). Xylene (24 ug/L) and ethylbenzene (4 ug/L) were detected at MW-10/I. MW-11/S had the highest VOC concentrations of all wells sampled, with 290 ug/L of trichloroethene, and lower levels of carbon tetrachloride (16 ug/L), 1,2-dichloroethene (14 ug/L), 1,1,1-trichloroethane (10 ug/L), tetrachloroethene (3 ug/L) and toluene (1 ug/L). Well MW-11/I contained the same compounds at similar or lower concentrations, and also contained xylene (1 ug/L), 1,1-dichloroethane (1 ug/L) and benzene (.6 ug/L).

The concentrations of dissolved manganese in the onsite wells were similar to those observed in the background wells. Concentrations of 169, 292, 334 and 760 ug/L were reported for MW-2/S, MW-2/I, MW-5/S and MW-5/I, respectively. These concentrations are higher (by a factor of four) than

those reported in the RI, except at MW-5/S, which exhibited a decrease.

Dissolved manganese concentrations ranged widely in the offproperty wells. The lowest concentrations were in MW-10/S and MW-11/S (1.2 and 55.1 ug/L, respectively). MW-9/S and MW-11/I had concentrations similar to background (330 and 473 ug/L, respectively). MW-10/I had the highest concentration of dissolved manganese, at 4840 ug/L. The low manganese at MW-10/S is probably a result of the high pH at that well, thought to be caused by cement grout that may have entered the well screen. The cause of the high manganese concentration in the adjacent well MW-10/I is unknown at this time.

Overburden Wells

Trichloroethene was detected in both MW-3/0 and MW-6/0 (78 and estimated 8 ug/L, respectively). Other volatile organics detected included 1,2dichloroethene (3 ug/L), 1,1-dichloroethene (2 ug/L), 1,1,1 trichloroethane (7 ug/L) and carbon tetrachloride (4 ug/L) in MW-3/0 and xylene (12 ug/L), ethyl benzene (2 ug/L), and toluene (.4 ug/L) in MW-6/0. The results for the 1992 sampling were very similar to those for the 1989 RI sampling, except for the recent detections of xylene, ethylbenzene and toluene in MW-6/0.

MW-3/0 had 236 ug/L of dissolved manganese, which is similar to the concentrations reported for the bedrock wells. MW-6/0 had the highest concentration of manganese of all monitoring points, at 7420 ug/L. The concentrations at these two wells were significantly lower than the 1620 and 14500 ug/L reported during the RI.

Ground Water Level Surveys

A total of five rounds of water level measurements were collected during this investigation. These measurements are presented in Table 5. The water level elevations from one of these events have been plotted on Site maps, and the potentiometric surfaces plotted for the shallow and intermediate bedrock systems.

Figures 3 and 4 present the August 1992 data for the shallow and intermediate flow systems, respectively. These data are consistent with the patterns displayed in the other 1992 monitoring events.

C. Conclusion

The SHI confirmed the presence of VOCs, including TCE, and manganese in the ground water in the Site area. The direction of ground water flow and distribution of the VOCs in the ground water, both on and off the Site, indicate that the VOCs in the ground water beneath the Site have emanated from an upgradient source. Figures 9 and 10 depict the TCE plume that is partially under the Site.

Manganese was detected in the ground water and surface water both upgradient and downgradient of the Site. However, two wells downgradient of the Site, and the sediment and the surface water in the unnamed tributary, had significantly higher concentrations of manganese than was found in upgradient samples.

VII. SUMMARY OF SITE RISKS

This section of the Record of Decision summarizes the risk, if any, posed by the contaminated ground water at the Site. This summary is based on the Endangerment Assessment (or Baseline Risk Assessment (BRA)) done as part of the Remedial Investigation and completed in January 1990. Since that time there have been some changes in the toxicological information on hazardous substances, including manganese, and more Site-specific information on contaminant fate and transport. EPA has updated the risk calculations for the Site to reflect the new toxicological information. In addition, EPA has calculated a current risk posed by Site conditions, and a hypothetical future risk that assumes a downgradient drinking water well and consumption of fish from the Little Schuylkill River. It is important to point out that there is no current risk associated with exposure to the deep ground water at the Site since there is no receptor - no downgradient well where exposure could occur. Additionally, as discussed below, it is highly unlikely that a downgradient well (receptor) will be installed.

The majority of the hypothetical future noncarcinogenic risk associated with deep ground water at the Site is presented by manganese which may not be solely related to the waste at the Site but which may be due to naturally occurring conditions. The concentration of manganese in the background wells upgradient of, and unaffected by, the Site exceeded the Draft Lifetime Adult Health Advisory (HA) of 200 ppb. The concentration of manganese in surface water upgradient and downgradient of the Site on the Little Schuylkill River also exceeded the HA. The EPA Office of Water provides the HA as technical guidance on the concentrations of manganese in drinking water estimated to have negligible deleterious effects in humans over a lifetime.

The majority of the hypothetical future carcinogenic risk associated with the deep ground water at the Site is due to the presence of TCE. However, based on the influence of topography, faults and fractures in the aquifer and the resultant ground water flow direction, as well as the results of sampling to date, EPA believes that the source of the TCE is upgradient of the Site, and not from the Site itself. TCE has not been found in samples of the fluff or leachate emanating from the fluff. Rather, EPA believes the TCE may have entered the ground water upgradient of the Site through activities unrelated to operations at the Site. For this reason, this summary does not present information on any carcinogenic risk, either current or future, posed by the TCE in the deep ground water.

A. Exposure Assessment Summary

The potential for completion of exposure pathways to the contaminants present at the Site is described in the following sections.

1. Exposure Points

The potential points of exposure to compounds associated with Site ground water are described below:

- Ground water exposure from a hypothetical potable well near the Site

boundary;

- Surface water exposure at the leachate seeps onsite, the unnamed stream, and/or the Little Schuylkill River;

- Exposure to contaminants in edible fish tissue.

2. Potentially Exposed Human Populations

The potential population categories evaluated were children ages 26; children ages 6-12; and adults, including onsite maintenance workers, offsite residents, offsite workers, and hunters and fishermen. A summary of the potential Site-related exposures to affected populations analyzed in this assessment is shown in Table 6.

3. Exposure Point Concentrations

Exposures were estimated for the maximum and average concentrations for each of the indicator chemicals found in the ground water and surface water at the Site during the RI. When calculating the average concentration, half of the detection limit was used as the concentration in a given sample for indicators which were not detected in that sample. For ground water, only downgradient wells were used for the calculations. The measured and calculated values are presented in Table 7. The major assumptions concerning exposure frequency and duration that were included in the exposure assessment are shown on Table 8.

Receptors for the surface water and sediment contact pathways were either expected to be present, although infrequently, in the area in which samples were taken or the concentrations found during the RI were used as a deliberately conservative estimate of potential concentrations downstream. Thus, all exposures were expected to be represented by the concentrations found in the samples taken at the Site.

B. Toxicity Assessment Summary

A toxicity evaluation of the indicator chemicals selected during the BRA was conducted to identify relevant chronic reference doses against which exposure point intakes could be compared in the risk characterization of the Site. Indicator compounds are those which are the most toxic, prevalent, persistent and mobile, and which contribute the major potential risks at the Site. Indicator compounds selected for the Site's ground water andsurface water that are classified as noncarcinogens include lead, copper, zinc, and manganese.

Reference doses (RfDs) have been developed by EPA for indicating the potential for adverse health effects from exposure to chemicals exhibiting noncarcinogenic effects. RfDs, which are expressed in units of mg/kg-day, are estimates of lifetime daily exposure levels for humans, including sensitive individuals that are likely to be without an appreciable risk of adverse health effects. Estimated intakes of chemicals from environmental media (e.g., the amount of a chemical ingested from contaminated drinking water) can be compared to the RfD.

C. Risk Characterization Summary

1. Noncarcinogenic Risk

The Hazard Index (HI) Method is used for assessing the overall potential for noncarcinogenic effects posed by the indicator compounds. Potential concern for noncarcinogenic effects of a single contaminant in a single medium is expressed as the hazard quotient (HQ) (or the ratio of the estimated intake derived from the contaminant concentration in a given medium to the contaminant's reference dose). By adding the HQs for all contaminants within a medium or across all media to which a given population may reasonably be exposed, the HI can be calculated. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media.

The HQ calculation is made by dividing the "worst case" human exposure estimates associated with a site by exposure levels that are determined by EPA to be acceptable. The ratios are added to represent exposures to multiple contaminants. Any result of this calculation which is greater than 1.0 is considered to present an unacceptable risk and indicate the potential for adverse health impacts. Tables 9-11 present the calculated hazard indices associated with each of the exposure points, exposed populations (for each age group evaluated), and routes of exposure identified previously. Exposures to multiple sources of contamination through several routes of exposure may occur. Therefore, the sum of all hazard

indices for each single age group and exposed population is given.

Most probable and maximum hazard indices have been calculated, using the most probable and maximum intakes calculated previously. The most probable intake is calculated using the average exposure point concentration of the indicator chemical; the maximum intake is calculated using the maximum exposure point concentration.

Current maximum hazard indices calculated for adults and children are .06 and .15, respectively. Current risk assumes a "fence down" scenario, dermal contact with the Site leachate and dermal contact with, and incidental ingestion of, surface water from the unnamed tributary of the Little Schuylkill River and the Little Schuylkill River. Hypothetical future maximum hazard indices calculated for adults and children (ages 6-12 and 2-6) are 89.00, 218.00, and 395.00, respectively. Hypothetical future risk assumes ingestion, inhalation and dermal contact with contaminated ground water and ingestion of fish from the Little Schuylkill River. This risk is hypothetical since there is no well on the State Game Lands and there are no fish in the Little Schuylkill River. Table 12 presents the most probable and maximum current and hypothetical future noncarcinogenic hazard indices for all the age groups evaluated.

2. Carcinogenic Risk

The sole indicator chemical identified as a potential carcinogen in the Site ground water during the BRA was TCE. Manganese and the other metals found in ground water and surface water are not carcinogenic. Since TCE is not a Site-related contaminant, information on the risk associated with TCE is not

presented in this ROD. Based on current information, there is no carcinogenic risk, either current or hypothetical future, associated with the deep ground water contamination attributable to the Site.

3. Environmental Risk

The major ecosystem of the Site and surrounding ridges is the eastern deciduous forest. The wetland community is limited to the small flood plain of the unnamed stream and the LSR and several small emergent wetlands. All of these wetland areas, except one small emergent wetland, are located offsite. Although an intensive ecological risk assessment was not conducted, some indication of potential risk to wildlife and the environment can be assessed from the toxicity testing (bioassays), field assessment and human health risk analysis and Site conditions.

The lack of suitable habitat on the Site, as well as the security fence, results in minimal wildlife presence at the Site.

The Site is located near a migratory route and a variety of song birds and raptors may periodically visit the area.

No rare or endangered species have been reported or observed on or near the Site. Several species that are not currently endangered or threathened but may become so in the future may be present in the forest habitat near the Site. These include the red-headed wood pecker, bluebird, snowshoe hare, bobcat, timber rattlesnake and rock vole. The river otter may also be present in wetland habitat in the Site area.

Several species that may be of special concern and may be present near the Site include the coyote (in the forest habitat); the forked clubtail dragonfly, canadian white-faced skimmer dragonfly and the water shrew (in the wetland habitat); and the eastern pearlshell (in the aquatic habitat).

The unnamed tributary of the Little Schuylkill River currently supports little aquatic life, most likely due to elevated contaminant levels. Direct discharge of contaminated overburden ground water and contaminated seeps into the unnamed stream have resulted in contaminated sediments and surface water in the stream. Federal and state surface water standards are exceeded for copper, lead, zinc, manganese, and iron in this stream. The results of the bioassay testing of the unnamed tributary water performed during the RI concluded that the toxicity to the test organisms was most probably due to the concentration of heavy metals in the stream.

The Little Schuylkill River does not support resident aquatic life for approximately 5 miles downstream due to its acid mine degraded condition. Transport of sediment does not seem to have a significant effect on metals concentrations because sediment samples collected from the Little Schuylkill River both upstream and downstream of the tributary did not significantly differ for metals.

D. Risk Assessment Limitations and Assumptions

Discussion of general limitations inherent in the risk assessment process as well as some of the major assumptions made in this assessment are included

below.

1. The Baseline Risk Assessment was performed using sampling data collected during the RI and predictive modeling to represent environmental concentrations over large areas. Extrapolation of data inherently introduces variability to risk assessment calculations and results.

2. The BRA assumed the transport of compounds associated with the Site under steady-state conditions (i.e., continuous release of contaminants into the environment at concentrations detected during the RI sampling). Steady-state conditions may not be occurring since the maximum concentration of TCE in onsite bedrock wells and manganese in the ground water during the RI was approximately two times that found during the SHI.

3. There is no current risk associated with exposure to the ground water at the Site since there is no downgradient well where exposure could occur. The potential for future human exposure to deep ground water is highly unlikely since the small area of land downgradient of the Site between the Site and the regional discharge point for ground water (the Little Schuylkill River) is State Game Lands and largely comprised of wetland and floodplain for the LSR. In addition, a public water supply exists in the Site area and is utilized by upgradient facilities in the industrial park to the east of the Site. No downstream use of the Little Schuylkill River water (which is the discharge point for deep ground water from the Site) for residential water supplies has been identified in the vicinity of the Site at this time. There is also no aquatic life in the LSR in the Site vicinity; however, aquatic life in the unnamed tributary is exposed to contaminated sediments and shallow ground water via direct discharge and seepage from the Site.

4. With respect to the leachate, the dermal contact and ingestion exposures for children are calculated according to a "fence down" scenario which assumes that there is no impediment preventing access to the Site. It is also important to point out that risk estimates were based on continuous (or chronic) lifetime exposure to the Site. The calculated risk for each population was based on contact with the exposure point concentrations in the various media during the entire time an individual within an age group falls within that age range (i.e. 4 years for age 2-6; 6 years for age 6-12; and 58 years for adults, assuming a total lifetime of 70 years). However, it is unlikely that any one individual will be exposed to this Site in all of the ways that are assumed here for his or her entire lifetime.

5. RfDs are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied (e.g., to account for the use of animal data to predict effects on humans). These uncertainty factors help ensure that the RfDs will not underestimate the potential for adverse noncarcinogenic effects to occur. The RfDs contain uncertainties resulting from extrapolating from high to low doses and from animals to humans.

6. Due to the limitations of the risk assessment process itself and to conservative assumptions made specific to the Site, the risk levels calculated are considered to be estimates of worst-case risk.

E. Risk Assessment Conclusions

1. Based upon the current conditions at the Site there is no unacceptable noncarcinogenic risk to human health associated with dermal contact with the Site leachate and dermal contact with, and incidental ingestion of, surface water from the unnamed tributary to the Little Schuylkill River and the Little Schuylkill River, based on contaminants from the Site.

2. Under a hypothetical scenario that includes a downgradient drinking water well and consumption of fish from the Little Schuylkill River (in addition to the current Site risk assumptions made above) there would be an unacceptable noncarcinogenic risk to human health presented by the deep ground water at the Site. However, as discussed above, a hypothetical downgradient drinking water well is highly unlikely, and for the purposes of this ROD it is assumed that there will be no such wells.

3. The results of the unnamed tributary water bioassay performed during the RI indicated probable Site-related toxicity to aquatic life in the stream due to metals. The unnamed tributary currently supports little aquatic life, most likely due to elevated levels of metals in the surface water and sediment. Federal and state surface water standards are exceeded for copper, lead, zinc, manganese, and iron. Direct discharge from the WWTP and overburden ground water discharge through leachate seeps into the unnamed tributary have resulted in the contamination of sediments and surface water in the stream with metals. The March 1991 ROD called for, among other things, upgrading the WWTP to remove metals, cleanup of the unnamed tributary stream sediments, and enhancement of the shallow ground water/leachate collection system. Actions specified in the March 1991 ROD will be implemented to cleanup the unnamed tributary and reduce any Site-related impact to the Little Schuylkill River.

Based on a review of all the information set forth above and in the Administrative Record, EPA has determined that actual or threatened releases of hazardous substances, pollutants, or contaminants in the deep ground water from this Site have not presented, and do not currently present, an imminent and substantial endangerment to public health, welfare, or the environment.

VIII. DESCRIPTION OF SELECTED RESPONSE ACTION

No Action Deep Ground Water Alternative

The NCP requires that EPA consider a "No Action" Alternative for every site to establish a baseline for comparison to alternatives that do require action. Under this Alternative, no action would be taken at the Site to remove, remediate, contain, or otherwise address the deep ground water contamination. There would be no capital or operation and maintenance costs associated with this alternative. There are no ARARs associated with this alternative.

Where the Risk Assessment provides the basis for concluding that a Site, or portion of a Site, poses no current or potential threat to humanhealth or the environment, EPA may determine that its authority to undertake remedial action to ensure protection need not be invoked. Under such circumstances, cleanup standards and remedy selection protocols established under CERCLA

and the National Oil and Hazardous Substance Pollution Contingency Plan (such as compliance with applicable or relevant and appropriate requirements and evaluation of alternatives) are not triggered. A determination that "No Action" is required takes into account both current and reasonable maximum exposure scenarios using appropriate health and environmental criteria and standards that relate directly to the media and hazardous substances being considered. A "No Action" decision with regard to a particular media or operable unit is made with the understanding that no unacceptable exposures to site-related contaminants will occur.

Under the "No Action" alternative, no further remedial action for the deep ground water will be taken at the Site. However, response actions selected in the March 1991 ROD, including enhancement of the shallow ground water/leachate collection and treatment system at the Site, will still be implemented. These actions will reduce the Site's impact on the environment and reduce further the current risk to human health presented by the sediment and surface water in the unnamed tributary.

EPA will investigate the TCE ground water contamination in the Site area under a separate site investigation that will focus on identifying the source of such contamination.

IX. BASIS FOR NO-ACTION ALTERNATIVE

The primary basis for selecting the no action alternative for deep ground water is that there is no exposure to such ground water at present nor is any exposure likely in the future. No drinking water well is currently located in the area where the ground water contamination occurs nor is any well likelyto be placed there in the future. The area downgradient of the Site between the Site and the regional discharge point for the area deep ground water (the Little Schuylkill River) is State Game Lands.

Furthermore, the contaminant predominantly responsible for the noncarcinogenic risk at this operable unit (manganese) is present at background levels that exceed the HA, while the contaminant responsible for the carcinogenic risk (TCE) is not Site-related.

The majority of the noncarcinogenic risk associated with the Site's ground water and surface water pathways is attributable to manganese. Manganese is a naturally occurring element found in area soils, surface water, sediment and ground water. Manganese was also found in fluff at the Site.

The HA for manganese in drinking water (200 ppb) was exceeded in background surface water samples from the LSR take upstream of the Site with a detection of 286 ppb. The concentration of manganese downstream of the Site in the surface water of the LSR was detected at 305 ppb - not significantly different from the upgradient sample. Upgradient and downgradient sediment samples on the LSR also had similar concentrations of manganese.

Upgradient background ground water samples taken to determine natural conditions of the aquifer during the RI and SHI revealed manganese concentrations in the range of 252 to 655 ppb. With the exception of two wells, the concentration of manganese in the ground water upgradient and downgradient of the Site was not significantly different. The two wells

with high levels of manganese (7,420 ppb and 4,840 ppb) were located at the bottom of the watershed where saturated conditions exist in the materials overlying the bedrock. The SHI revealed that the four wells in closest proximity to the fluff pile had manganese concentrations similar to those found in the background well.

The presence of the manganese in ground water downgradient of the Site may be related to natural conditions in the bedrock aquifer, release of manganese from native soils underlying the fluff pile due to geochemical conditions caused by the fluff pile, from leaching of manganese from the fluff and migration in solution in the ground water or a combination of all three of these reasons. If the fluff pile is the source of the above-background concentrations of manganese, the removal of the fluff pile through recycling, as specified in the OU3 ROD, will remove this potential source of manganese and eventually allow the geochemical conditions to return to their natural state. Elimination of the fluff pile will not, however, by itself lead to a reduction of manganese in area ground water below the HA.

The Little Schuylkill River is the regional discharge point for deep ground water in the Site area. Bioaccumulation and fish ingestion was shown by the risk assessment to present an unacceptable noncarcinogenic risk due to the presence of manganese. However, as stated above, the levels of manganese upstream and downstream of the Site were not significantly different. In addition, the LSR is an acid-mine degraded stream that is reportedly devoid of macrobenthic organisms from its headwaters upstream of the Site and for several miles downstream of the Site.

The unnamed tributary of the Little Schuylkill River currently supports little aquatic life, due to elevated metals levels from the direct discharge from the WWTP and overburden ground water and contaminated seeps. This discharge has resulted in contaminated sediments and surface water in the stream. Federal and state surface water standards were exceeded for copper, lead, zinc, manganese and iron during the RI. The SHI confirmed that manganese in excess of background conditions and the HA concentration was present in the sediment and surface water. The remedy specified in the March 1991 ROD called for remedial action including, among other things, upgrading and WWTP for the removal of metals, cleanup of the unnamed tributary stream sediments, and enhancement of the shallow overburden ground water/leachate collection system. Actions specified in the March 1991 ROD will be implemented to cleanup the unnamed tributary and reduce any Site-related impact to the Little Schuylkill River.

The majority of the carcinogenic risk associated with the ground water and surface water pathways is attributable to TCE. However, the TCE in the ground water cannot be linked to the Site based on current information. Since 1984, EPA has been investigating the contaminants associated with the Site by collecting samples of soil, sediment, surface water, ground water, leachate and fluff. EPA has determined that the fluff pile at the Site consists of hazardous substances including metals, most notably lead, and organics compounds including phthalates and phenols. In all the analyses of fluff samples at the Site, TCE has never been detected. Additionally, historical records and interviews do not reflect the use of TCE during operations at the Site.

The Site is located on the northern fringe of the TCE plume (see Figures 9 and 10). The source of the TCE is upgradient and southeast of the fluff pile at the Site. TCE is therefore not a Site-related contaminant. TCE was detected in ground water at the Site but was found at higher levels in wells upgradient of the Site than in wells under the Site. EPA has determined that the TCE has likely originated from an upgradient source and not the fluff at the Site. EPA believes that TCE detected sporadically and at low levels in some onsite leachate seep samples from the unnamed tributary stream bank originates from upgradient ground water emerging under pressure from the saturated zone of the aquifer under the Site. EPA intends to address TCE ground water contamination in a separate investigation.

TCE was not found in the surface water sample from the LSR downstream of the Site and thus would not be available for bioaccumulation assumingfish were present in the LSR.

Since manganese is a naturally occurring element that already exceeds the HA in background surface water and ground water in the Site area, and TCE contamination in ground water is not related to the Site, EPA concludes that this Site poses no current or potential threat to human health or the environment through the deep ground water pathway. Accordingly, EPA has determined that no action be taken to remediate the deep ground water in connection with the Site.

EPA has the authority to revisit the No-Action decision with respect to the deep ground water even if the Site is removed from the NPL. This action could occur if deep ground water associated with the Site is found to pose an unacceptable risk to human health or the environment.

X. EXPLANATION OF SIGNIFICANT CHANGES

The Proposed Plan for OU2 of the Eastern Diversified Metals Site was released for public comment on July 1, 1993. The Proposed Plan identified "No Action" as EPA's preferred alternative for deep ground water remediation. EPA reviewed all written and verbal comments submitted during the public comment period. Upon review of these comments, EPA determined that no significant changes to the remedies, as originally identified in the Proposed Plan, were necessary.

EASTERN DIVERSIFIED METALS SITE
Hometown, Schuylkill County, Pennsylvania

RESPONSIVENESS SUMMARY
September 1993

This Responsiveness Summary documents public comments received by EPA during the public comment period on the Proposed Plan for OU2 of the Eastern Diversified Metals Site ("the Site") and provides EPA's responses to those comments. The Responsiveness Summary is organized as follows:

- Overview

- Summary of Citizens' Comments Received During the Public Meeting

and EPA's Responses

. Summary of Written Comments Received and EPA's Responses

A. OVERVIEW

The public comment period on the Proposed Plan for OU2 of the Eastern Diversified Metals Site began on July 1, 1993 and ended on July 31, 1993. EPA held a public meeting at the Marian High School in Tamaqua, Pennsylvania on July 15, 1993.

At the meeting, EPA representatives summarized the results of the Supplemental Hydrogeologic Investigation ("SHI") performed for the Site. They then presented EPA's preferred remedial alternative for the Site. EPA explained that the Proposed Plan called for no action to be taken in response to the contaminants in the deep ground water in the vicinity of the Site and explained the rationale supporting EPA's preference for this alternative.

Local residents offered comments on the Proposed Plan. Most comments related to concerns about the effects of the discharge of TCE to the Little Schuylkill River. The transcript of the public meeting is contained in the Administrative Record for this operable unit of the Site.

B. SUMMARY OF CITIZENS' COMMENTS RECEIVED DURING THE PUBLIC MEETING AND EPA'S RESPONSES

Comments made during the public meeting and EPA's responses are summarized below:

Public Comment #1: Is the wastewater treatment plant at the Site operating now?

EPA Response: Electrical power to the aerators in the wastewater treatment plant (WWTP) was shut off on June 22, 1993. Without aeration, the microorganisms in the activated sludge have probably died, thus it is unlikely that treatment is occurring. However, effluent does continue to flow through the plant and is discharged to the tributary to the Little Schuylkill River (LSR). Samples of the effluent were obtained by PADER on July 6, 1993 and analyzed for metals. EPA sampled the effluent on July 30, 1993 and analyzed for organic compounds. Results of the analysis showed no organic compounds were present in the effluent above the EPA required detection limit. Metals including zinc, lead copper, iron, manganese, and aluminum were present in the effluent. It should be noted that the WWTP has never treated the effluent for metals. The interim ROD for OU2, signed in March 1991, selected remedial action including the upgrading of the WWTP at the Site to include treatment for metals. The remedial actions selected in the March 1991 ROD will be implemented notwithstanding EPA's remedy selection for deep ground water at the Site.

Public Comment #2: Can failure to treat the shallow ground water ultimately complicate the deep ground water problem?

EPA Response: Since all of the water bearing zones at the Site are

interconnected, it is possible that failure to treat the shallow ground water could affect the deep ground water at the Site. A system is in place to collect the shallow ground water in the overburden at the Site and pump it to the wastewater treatment plant. However, this system is currently not operating. The manganese in the ground water under the Site is the primary contaminant of concern along with iron, aluminum, copper, lead and zinc in the leachate. The current WWTP at the Site does not treat for metals. The March 1991 ROD called for the enhancement of the shallow ground water collection and treatment system at the Site. This upgrade will provide for the collection and treatment of the leachate and shallow ground water in the overburden for metals.

Public Comment #3: What happens to the contaminated ground water if it is left untreated? Does it go deeper? Does it go away? Does it go into the LSR?

EPA Response: All ground water in the Site vicinity ultimatelydischarges to the LSR. Ground water in the overburden and shallow and intermediate bedrock at the Site are interconnected. Ground water in the overburden at the top of the watershed has been shown to recharge the shallow bedrock. At the bottom of the watershed, and in particular the vicinity of the fault at the western end of the Site where the unnamed tributary of the LSR becomes perennial, the bedrock aquifer flows up into the overburden. The levels of manganese upstream and downstream of the Site on the LSR were not significantly different. TCE was not found in surface water samples downstream of the Site and thus would not be available for bioaccumulation assuming fish were present in the LSR. Unfortunately, the LSR is an acid mine degraded stream that is reportedly currently devoid of macrobenthic organisms from its headwaters upstream of the Site and for several miles downstream of the Site.

Public comment #4: What effect would the contaminated ground water have on the LSR and hunters and other people using the LSR?

EPA Response: The Endangerment Assessment performed on the Site analyzed the risk to hunters and fishermen exposed to contaminated surface water from the Site (via dermal contact, incidental ingestion and bioaccumulation through fish ingestion). Current dermal contact with and incidental ingestion of the contaminated surface water would not present an unacceptable noncarcinogenic risk. Bioaccumulation through fish ingestion could present an unacceptable noncarcinogenic risk if fish were present in the LSR, due in large part to the presence of manganese in the surface water. However, it is important to note that the SHI showed no significant difference in the concentration of manganese in samples taken from upstream and downstream of the Site on the LSR.

There is no current or future carcinogenic risk associated with dermal contact, incidental ingestion or bioaccumulation through fish ingestion of the surface water in the LSR since there were no carcinogenic compounds (organic chemicals including TCE) detected in samples of the LSR. The TCE present in the ground water volatilizes or is dissipated when it reaches the LSR and therefore it would not be available to present an exposure threat to hunters, fishermen and other utilizing the LSR.

Public Comment #5: What effect would the contaminants have on downstream use of the water as a water supply? Do the contaminants dissipate?

EPA Response: There is no use of the LSR for drinking water in the Site vicinity. TCE and other volatile organics were detected in the intermittent stream just prior to its discharge to the LSR; however, no volatile organics were detected in the downstream sample taken from the LSR. The contaminants in the LSR are either volatilizing or are diluted to the point of being below the EPA required detection limit.

Public Comment #6: What effect does the ground water have on fish life in the stream? Do the contaminants get into the food chain? If the Little Schuylkill group succeeds and there are fish brought back to the upper region of the stream, will this (ground water discharge) constitute a continuing threat?

EPA Response: As stated above there currently is no aquatic life in the LSR in the vicinity of the Site. No organic contaminants were detected in the surface water downstream of the Site and the levels of manganese upstream and downstream were not significantly different, so it is difficult to assess what, if any, impact the Site has on the quality of the LSR. If the Little Schuylkill group succeeds in reducing the acid conditions and metal levels in the LSR, it will then be possible to determine the Site's impact on the stream. EPA will be reviewing the selected remedy at least every five years to determine whether the remedy remains protective. EPA recognizes the Site's impact to the unnamed tributary of the LSR that drains the Site. The March 1991 Recordof Decision called for the remediation of sediments in the unnamed tributary and enhancements to the shallow ground water collection and treatment at the Site.

Public Comment #7: A commenter requested to see a comparison of samples of the effluent from the WWTP before and after the WWTP was shut down.

EPA Response: EPA and PADER recently sampled the effluent from the inoperable WWTP for organic compounds and metals. No organic compounds were detected in the sample. The WWTP has never treated the effluent for metals and, as expected, some metals were present in the latest sampling of the effluent. A comparison of the metals results of the most recent sampling of the effluent and samples taken on September 4, 1990 indicated no clear trend in the results. The July 6, 1993 sample contained copper (27 ppb), lead (50 ppb), and zinc (684 ppb) at lower concentrations than the 1990 sample but iron (4,810 ppb), manganese (2,270), and aluminum (135 ppb) at higher concentrations than the September 1990 sample.

Public Comment #8: What can EPA do if they find the source of the TCE in the ground water?

EPA Response: Under CERCLA, EPA has the authority to cleanup or to require that responsible parties cleanup hazardous substances that have been released to the environment.

Public Comment #9: In the no action plan, how long does the Site continue to be monitored? By whom?

EPA Response: There are no plans to continue monitoring the ground water at the Site. Under CERCLA, the no action decision must be reviewed at least every five years.

Public Comment #10: Is it safe to say that until you prove positively where the TCE is coming from, to say that it's not coming from the here [the Site] is going to be difficult?

EPA Response: Based on the influence of topography, faults and fractures in the aquifer and the resultant ground water flow direction, as well as the results of sampling to date, EPA believes that the source of the TCE is upgradient of the Site, and not from the Site itself.

Public Comment #11: Can you postpone the no action decision until the source of the TCE is found?

EPA Response: Since the TCE is not a Site-related contaminant but is being released into the environment from an upgradient source, there is no reason to postpone the no action decision for the operable unit of the Site.

B. SUMMARY OF WRITTEN COMMENTS RECEIVED AND EPA'S RESPONSES

Copies of all written comments received are contained in the Administrative Record for this operable unit. The written comments and EPA's responses are summarized below:

ERM Comments: In a letter dated July 29, 1993, Environmental Resources Management, Inc. ("ERM") commented on the Proposed Plan for the Site on behalf of AT&T. ERM stated that it "...strongly agrees that the No Action finding for deep ground water in the Plan is appropriate to the conditions at the Site." ERM makes several comments not related to the Plan but to the previous interim remedy for OU2 selected in the March 1991 ROD.

EPA Response: No response is necessary.

RSS&M Comments: In a letter dated July 29, 1993, Harley N. Trice II of the law firm of Reed Smith Shaw & McClay ("RSS&M") commented on behalf of Alabama Power Company, Duke Power Company, Duquesne Light Company and Prestolite Wire. RSS&M stated "[w]e believe EPA's selection of the "No Action" alternative regarding ground water remediation is sound and reasonable in light of the scientific evidence that no unacceptable exposures to site-related contaminants from ground water will occur."

EPA Response: No response is necessary.

RSS&M Comments: In a letter dated July 30, 1993, Franklin L. Kury of the law firm of Reed Smith Shaw & McClay ("RSS&M") commented on behalf of East Penn Manufacturing Company, Inc. RRS&M stated "East Penn supports EPA's "No Action" decision regarding ground water remediation at the Site," and that the alternative "...is sound and reasonable in light of the evidence that no unacceptable exposure to site-related contaminants from ground water will occur."

EPA Response: No response is necessary.